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## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-171130

(43)Date of publication of application : 09.07.1993

(51)Int.Cl.

C09K 3/00  
B29C 45/00  
B29C 47/14  
C08J 5/00  
// B29K105:16  
B29L 7:00

(21)Application number : 03-269591

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(22)Date of filing : 17.10.1991

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(54) ULTRAVIOLET-SCREENING TRANSPARENT RESIN MOLDING

(57)Abstract:

PURPOSE: To provide the subject transparent resin molding excellent in transparency, ultraviolet shielding properties and durability.

CONSTITUTION: In a transparent resin such as polycarbonate, polyvinyl chloride or an acrylic resin, 0.5 to 10vol.% zinc oxide fine powder having  $\leq 0.1\mu\text{m}$  particle size is uniformly monodispersed and the resultant mixture is pelletized. The obtained pellet is molded into a desired shape such as a plate shape by extrusion molding, injection molding, etc.

### LEGAL STATUS

[Date of request for examination] 31.08.1998

[Date of sending the examiner's decision of rejection] 08.08.2000

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the ultraviolet-rays cutoff nature transparence resin Plastic solid used for transparency, such as transparence sheets for a package, such as a transparence plate of a show window or a showcase, the transparence shade for lighting, and food, a film, and a container, and the various applications which require the ultraviolet-rays cutoff engine performance.

[0002]

[Description of the Prior Art] It is known that an object will deteriorate, deteriorate and discolor by the ultraviolet rays generally included in the illumination light or sunlight. These ultraviolet rays set the object with which the lighting shade or the illumination light is irradiated in lighting in the exhibition goods of the transparence plate or the interior which forms these in a show window or a showcase for the food which carried out the transparence package, deteriorate and deteriorate, make transparence wrapping or food discolor, respectively, and do a bad influence.

[0003] In order to prevent the bad influence of these ultraviolet rays conventionally, the coating which blended the coating which blended the organic system ultraviolet ray absorbent, the coating which blended titanium oxide, or the zinc oxide was applied to the front face of the various transparent bodies, such as the above-mentioned transparence plate, the transparence shade, and transparence wrapping, and the ultraviolet-rays cutoff nature paint film was formed in it.

[0004]

[Problem(s) to be Solved by the Invention] However, when the coating which blended the organic system ultraviolet ray absorbent was applied, the organic system ultraviolet ray absorbent itself, such as a benzophenone system, a benzotriazol system, a salicylate series, and a permutation acrylonitrile system, had a health top problem to the body, it was lacking in thermal resistance, and there was a trouble which follows on a paint film absorbing ultraviolet rays, and the paint film itself deteriorates and is easy to discolor.

[0005] When the coating which blended titanium oxide was applied, there was a trouble which titanium oxide itself yellows by ultraviolet rays. Although the transparency paint film superior to the two above-mentioned paint films was obtained when the coating which blended the zinc oxide was applied, since the zinc-oxide particle was distributed over the front face, a zinc oxide tended to deteriorate in zinc hydroxide with the moisture in air etc., and there was a trouble of being inferior to endurance.

[0006] Moreover, since each conventional thing applied the coating on the surface of the transparent body and formed the ultraviolet-rays cutoff nature paint film, in order to protect both the transparent bodies and the internal exhibition goods which form these, for example in a show window, a showcase, etc. from ultraviolet rays, the coating had to be applied to inside-and-outside both sides of the transparent body, and it had become cost quantity while spreading was troublesome.

[0007] This invention aims at offering the ultraviolet-rays cutoff nature transparence resin Plastic solid which canceled this conventional trouble.

[0008]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, this invention is harmless to the body, and it is hard to discolor it by ultraviolet rays, and it pays its attention to the zinc-oxide ultrafine particle from which transparency is acquired. Namely, as for this invention ultraviolet-rays cutoff nature transparency resin Plastic solid, it comes to carry out mono dispersion of the zinc-oxide impalpable powder with a particle size of 0.1 micrometers or less to 0.5 - 10 capacity % homogeneity into transparency resin.

[0009]

[Example] Hereafter, this invention is explained. After it makes homogeneity carry out mono dispersion of the zinc-oxide impalpable powder with a particle size of 0.1 micrometers or less into transparency resin and this invention ultraviolet-rays cutoff nature transparency resin Plastic solid pelletizes it, it is the object fabricated in desired configurations, such as tabular, with extrusion molding, injection molding, etc. A polycarbonate, a polyvinyl chloride, acrylic resin, etc. are used as the above-mentioned transparency resin. In addition, as for the distributed approach into the resin of zinc-oxide impalpable powder, the conventional approach should just be adopted suitably.

[0010] As for zinc-oxide impalpable powder, it is desirable to consider as an ultrafine particle with a particle size of 0.1 micrometers or less in order not to spoil the transparency of a transparency resin Plastic solid and to demonstrate the ultraviolet-rays cutoff engine performance. Moreover, as for zinc-oxide impalpable powder, it is desirable to carry out 0.5-10 capacity % homogeneity mono dispersion into transparency resin generally. The reason is because the ultraviolet-rays cutoff engine performance cannot be demonstrated and mono dispersion cannot be carried out to homogeneity into transparency resin above 10 capacity % below in 0.5 capacity %. The loadings of the above-mentioned zinc-oxide impalpable powder are more desirable in it being the range of 0.5 - 2 capacity %.

[0011] Next, the transparency plate which 2 capacity % homogeneity was made to carry out mono dispersion of the zinc-oxide impalpable powder with a particle size of 0.1 micrometers or less into acrylic resin, pelletized, and fabricated this as a plate with a thickness of 2mm by extrusion molding (example), About the transparency plate (example of a comparison) which applied the coating to both sides of an acrylic board with a thickness of 2mm conventionally which blended the zinc oxide, and formed the paint film in them, the rate of an ultraviolet-rays cut and light permeability were investigated, and the result was shown below.

[0012] the condition after the weathering test (500 hours) according [ the rate of an ultraviolet-rays cut and light permeability ] to the initial state of a transparency plate, and a sunshine weather meter -- the Shimadzu make -- it measured using spectrophotometer UV-1200.

[0013]

Initial state Condition after a weathering test Rate of an ultraviolet-rays cut Light permeability Rate of an ultraviolet-rays cut Light permeability Example 100% 88% 90% 85% Example of a comparison 98% 90% 82% 78% [0014] Although an example and the example of a comparison hardly changed about the initial engine performance, about the engine performance of the condition after a weathering test, it was admitted that the example was superior to the example of a comparison.

[0015]

[Effect of the Invention] As explained in full detail above, without spoiling the transparency of a Plastic solid, since mono dispersion of the zinc-oxide impalpable powder with a particle size of 0.1 micrometers or less is carried out to 0.5 - 10 capacity % homogeneity into transparency resin, this invention ultraviolet-rays cutoff nature transparency resin Plastic solid can demonstrate the outstanding ultraviolet-rays cutoff engine performance, like the ultraviolet-rays cutoff nature paint film by the conventional coating, by ultraviolet rays, easily, it does not discolor, and does not deteriorate but can use it as the stable transparent body.

[0016] And since zinc-oxide impalpable powder is distributing inside a transparency resin Plastic solid, like the ultraviolet-rays cutoff nature paint film by the conventional zinc-oxide combination coating, a zinc oxide is distributed over a transparent-body front face, with the moisture in air etc., it can be hard to deteriorate in zinc hydroxide, deterioration of a zinc oxide can be delayed as much as possible, and endurance can be raised.

[0017] Moreover, since zinc-oxide impalpable powder is the Plastic solid by which mono dispersion was carried out to homogeneity into transparence resin, like the former, time and effort which applies a coating to inside-and-outside both sides of the transparent body, and prevents ultraviolet ray degradation is not needed, the Plastic solid itself has the ultraviolet-rays cutoff engine performance, and it can presuppose that it is relatively cheap also in cost.

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[Translation done.]